MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2022 / 2023 (TERM ID: 2210)

PPS0335 – PROBLEM SOLVING AND PROGRAMMING

(Foundation in Information Technology)

9 FEBRUARY 2023
2.30 p.m – 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 4 pages (excluding the cover page) with 5 questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Script provided.

QUESTION 1 [10 Marks]

a. What are the **SIX (6)** steps of problem solving that we can use in everyday life to ensure the best decision?

(3 marks)

b. When you write computer programs, you may encounter program errors such as syntax errors and logic errors. Explain the difference between these two types of errors and give an example of each type of error.

(3 marks)

c. Control structures in most programming languages are used to express the logic of the instructions in the programs. Name the **FOUR (4)** control structures used in many programming languages.

(2 marks)

d. Define algorithmic solutions and heuristic solutions.

(2 marks)

QUESTION 2 [10 Marks]

a. Write computer equations for the following problems. Use the variables (bold and italic) indicated in the questions to create the equations.

i. The perimeter of a rectangle is 24 cm. If the width is ***X*** cm, find the ***length***.
ii. This month, Kevin Mendoza earned only three-quarter of his earning last month. If his earning last month was ***X*** ringgit. How much did he ***earn*** this month?
iii. At Tuah Horse Riding Centre, a horse ride costs ***X*** ringgit per person for the first 30 minutes and ***Y*** ringgit for every additional 10 minutes. If you use 100 minutes for a horse ride, how much you have to ***pay***?
iv. 5 is subtracted from ***X*** and the difference is multiplied by ½. What is the ***answer***?
v. A fruit seller had some durians. He sells ***X***% of them and still has 320 durians. Find the number of ***durians*** he had originally.

(5 marks)

b. Convert the following English expression to computer expression.
i. The first value is not equal to the second value.
ii. The number of patients is more than or equal to 100
iii. The height is greater than 180 cm and weight is less than 70 kg
iv. The number is less than 20 or greater than 40

(2 marks)

c. Evaluate the following arithmetic expressions without using a calculator.

i. $4.4 / 2 * (3 + 7)$
ii. $4 * 5 \text{ MOD } 40 + 1$
iii. $6 + 4 / 3 * 2$
iv. $4 * 8 + 15.0 / 5$
v. $5 / 2 - 8 * (-1) - 8$
vi. $-6 * (2 - 3) - 11$

(3 marks)

Continued ...

QUESTION 3 [10 Marks]

a. A restaurant will add a 10% of service charge to your bill for a meal. Read the cost of the meal and develop a problem analysis chart (PAC) to calculate and print the total cost on the bill. Define the service charge as a constant value.

(3 marks)

b. Develop an input processing output (IPO) chart to find the selling price of a product using this formula:

*selling price = original price + (original price * profit in percentage)*

Read all inputs as input values.

(3 marks)

c. Write an algorithm to read a student level and CGPA. If the student level is "foundation" and CGPA is greater than or equal to 2.0 then print a message "Qualified for Bachelor's degree" otherwise print a message "Not Qualified for Bachelor's degree". If the student level is "diploma" and CGPA is greater than or equal to 2.0 then print a message "Qualified for Advanced Diploma" otherwise print a message "Not Qualified for Advanced Diploma". If the student level is "advanced diploma" and the CPGA is greater than or equal to 2.75, then print a message "Qualified for Bachelor's degree" otherwise print a message "Not Qualified for Bachelor's degree".

(4 marks)

QUESTION 4 [10 Marks]

a. A business owner charges 1.5% of processing fee when processing payments from customers who use a credit card. Develop a pseudocode to repeatedly read a payment made by 10 customers and at the same time to calculate the total payment, include the processing fee, of all the customers. After the loop, print the total_payment. Use repeat/until for the repetition

(4 marks)

b. Refer to the following pseudocode.

```
start:
    read x1, x2, y1, y2
    if (x1 <> 0) AND (x2 <> 0) AND (y1 <> 0) AND (y2 <> 0) then
        distance = (x2 – x1) * (x2 – x1) + (y2 – y1) * (y2 – y1)
    else
        distance = 0
    endif
    print distance
end:
```

What is the value of distance given;

i. x1 = 2, x2 = 4, y1 = 1, y2 = 3
ii. x1 = 4, x2 = 4, y1 = 6, y2 = 8
iii. x1 = 0, x2 = 3, y1 = 3, y2 = 0
iv. x1 = 10, x2 = 2, y1 = 0, y2 = 7

(2 marks)

Continued ...

c. Refer to **Figure 1**. Convert the following flowchart to an algorithm.

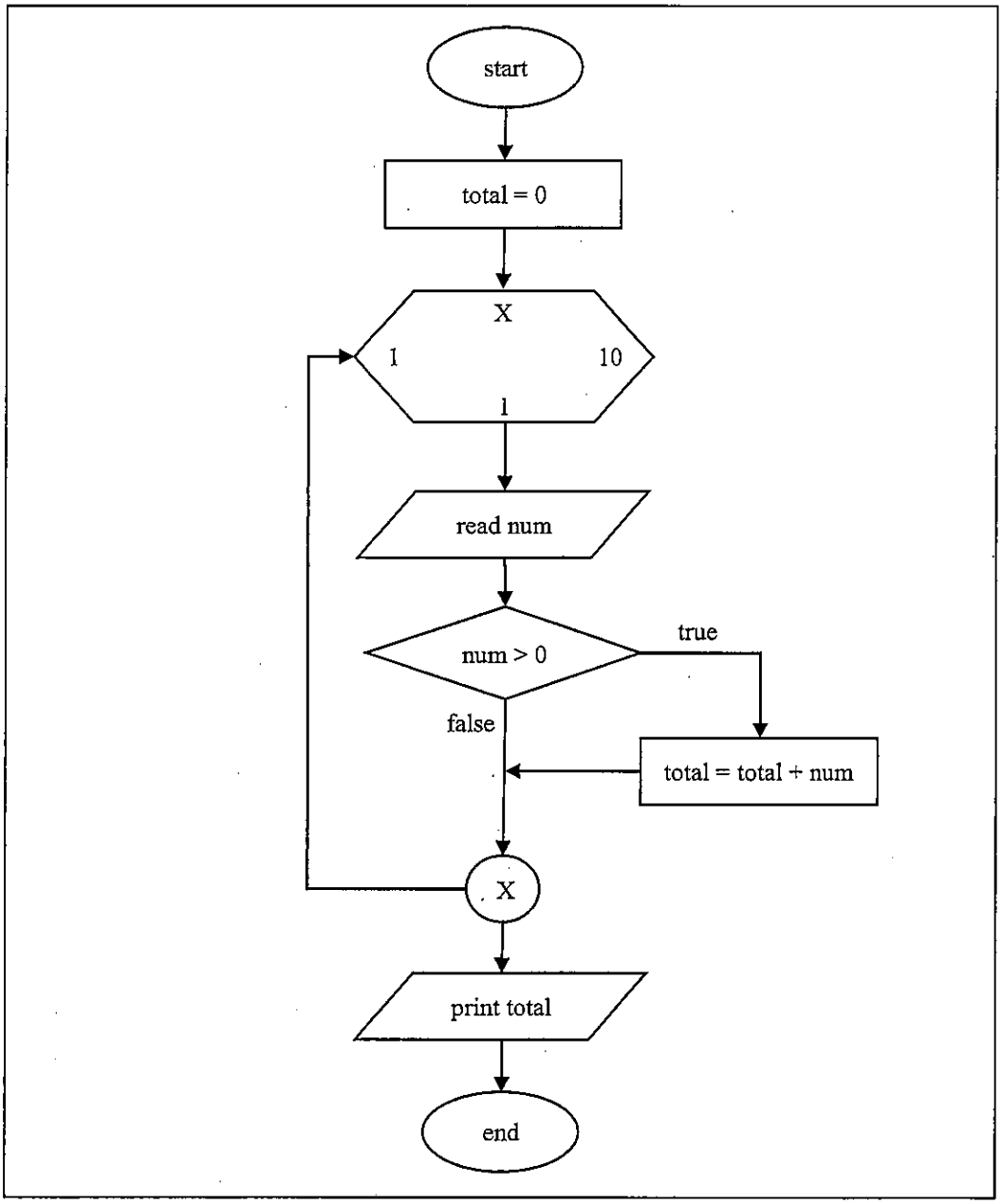

Figure 1: A flowchart to find total

(4 marks)

Continued ...

QUESTION 5 [10 Marks]

a. Write an algorithm for a function definition called ***maximum()*** which takes three parameters; a, b and c, and returns the largest value of the three parameters.

(3 marks)

b. **Table 1** shows the level and accuracy of typing speed test. Write a pseudocode to read the number of words typed per minute, and use if elseif else with negative-logic structure to determine and print the level and accuracy of the test.

(3 marks)

Table 1: Typing Speed Test

Words Per Minute	Level	Accuracy
24 and above	4	90%
20 - 23	3	85%
16 – 19	2	80%
12 - 15	1	75%

c. You want to develop a program to simulate the banknote counting machine that reads only banknotes in two denominations: RM50 and RM100. Develop a flowchart that will read a stack of banknotes with different denominations, but only print the total pieces of each denomination that is recognized by the machine. Use a while loop to read the banknotes and stop when the stack becomes empty that is until a zero is entered.

Example input: 100 10 20 5 50 100 100 1 1 50 10 20 20 0

Example output:

50 – 2 pieces
100 – 3 pieces

(4 marks)

End of Paper